

# COAL MINING

May, 1961

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Volume 38, No. 5

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MACHINERY CO.**

# COAL MINING

Vol. XXXVIII May, 1961 No. 5

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"It takes the hurry out of working fast." That is the way the veteran coal stripper S. C. Monnie describes his Cat D9E bulldozer. He is getting 30-50% more production out of the new D9 than he did with a previous unit at his strip job near Rochester Mills, Pa. The increase is due largely to the time-saving, cost-cutting power shift transmission and versatile hydraulic tilt blade.

In four hours work time, the D9 keeps a loading shovel busy for two shifts. The rest of the

time she's benching for a 2-1/2 cu. yd. drag-line and a 1-1/2 cu. yd. shovel.

Similar case histories on the new D9 attest to the new 335 HP turbocharged engine, the massive new undercarriage, lifetime rollers and operator-comfort features.

There is no harder work for the track-type tractors than coal-stripping . . . and there is no more successful production tool than the Cat D9E. Let us show you the power-shift model. It combines the best features of direct drive—solid operating feel, efficient use of fuel and power—with the flexibility and anti-stall characteristics of the torque converter machine.

Beckwith will match the D9E against any tractor you have or can buy today. See it work and discover new production heights yourself.



S. C. Monnie



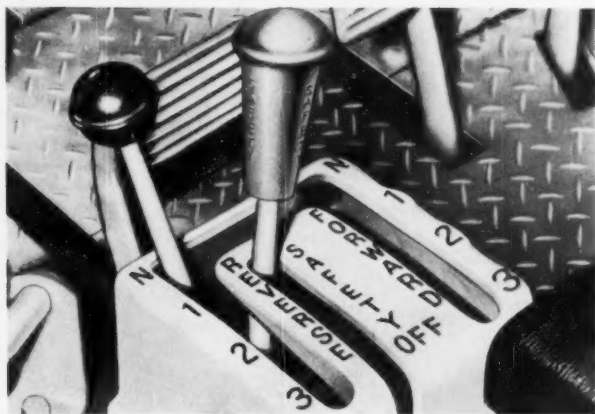
## Monnie Retires "Big Ruth"

Back in 1956 when the S. C. Monnie Company of Glen Campbell, Pa. bought one of the very first Cat D9 tractors in Pennsylvania, production of the machine set new records in the stripping fields. Christened "Big Ruth", she worked for four years, logged 14,000 hours of service, only needed tracks and rollers replaced once. Well satisfied with the operation and reliability of "Big Ruth", Mr. S. C. Monnie hated to retire her . . . but even the best can be improved by Caterpillar. Mr. Monnie settled only for a replacement that could reach new production heights . . . the D9E.





## HERE ARE ONLY A FEW OF THE MANY FEATURES THAT MAKE THE D9E BOSS OF THE BULLDOZERS



### POWER SHIFT TRANSMISSION . . .

Although both direct drive (with exclusive oil clutch) and torque converter drive are available, the power shift transmission offers lower cycle times for dozing, pushing and many other applications. You can shift on the go, under full load in split-seconds.

### IMPROVED UNDERCARRIAGE . . .

More massive than ever--bigger--stronger--more rugged. Larger links, pins, rollers, shoes, improved materials and the highest ground clearance in its class. Lifetime lubricated rollers never need lubrication until rebuild time.

### MORE POWER . . . 335 Horsepower

(up from 286) New design turbo-charger increases power output. The D9E packs more lugging ability, delivered by an efficient, low-maintenance Cat Diesel Engine.

### RUGGED ATTACHMENTS . . .

Hydraulic tilt cylinder puts more prying power on the corner of the blade; permits quick on-the-go tilting of the bulldozer, speeds removal of rocks and stumps. A rugged ripper and other attachments make the D9E more useful around a mine.



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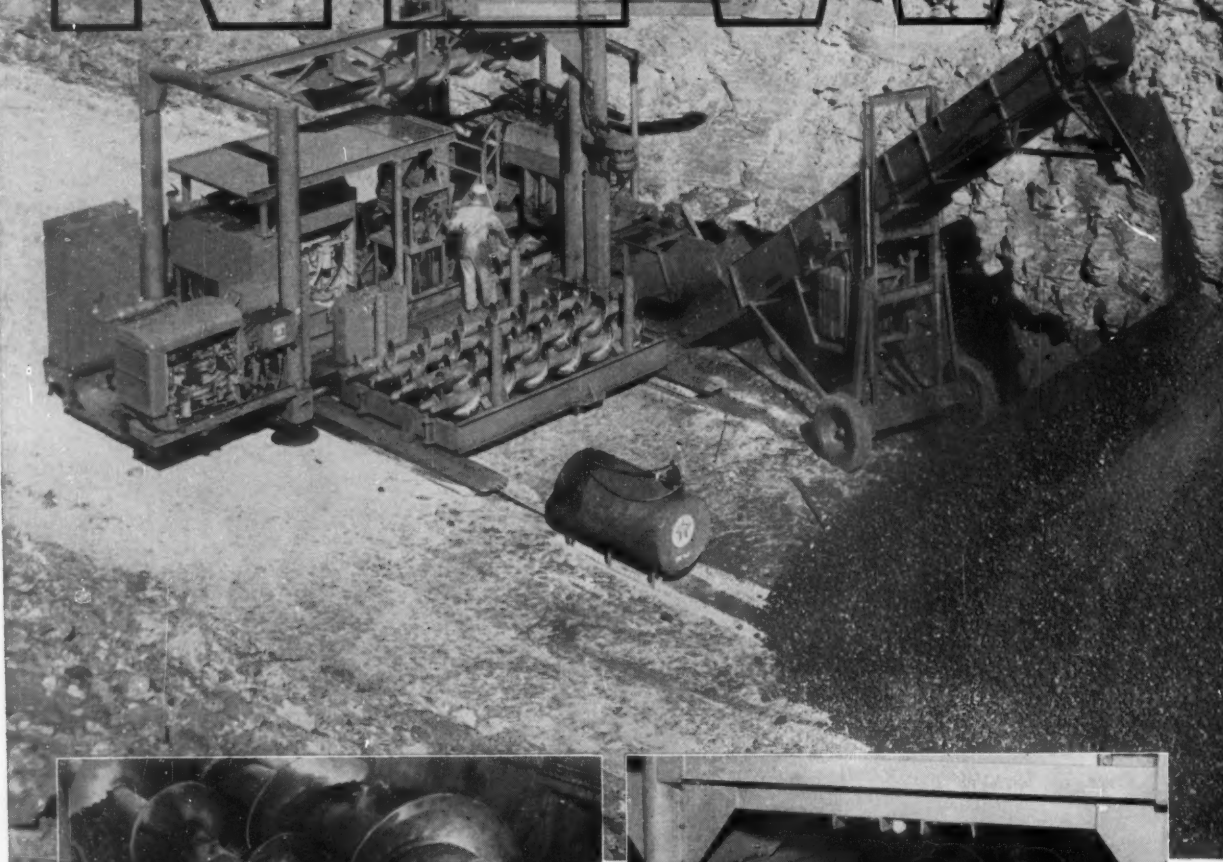
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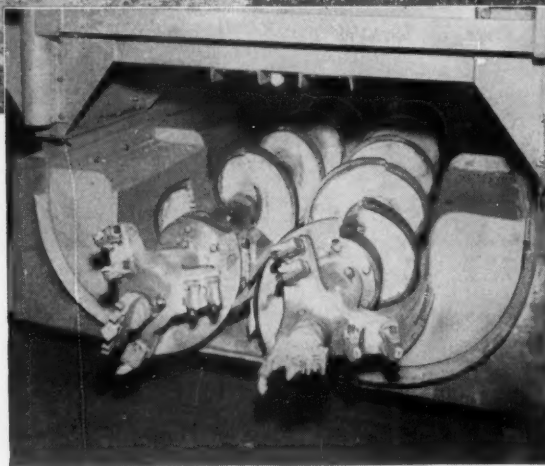
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
# NEW

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**AUGERS ROTATE IN OPPOSITE DIRECTIONS** eliminating the problem of one cutting head climbing over the other. Coal feeds back evenly on both augers, which maintains a better size consistency.



**COAL PRODUCTION IS INCREASED** by new rib breakers and special cutting heads designed specifically for this Dual coal auger. Holes look like this 

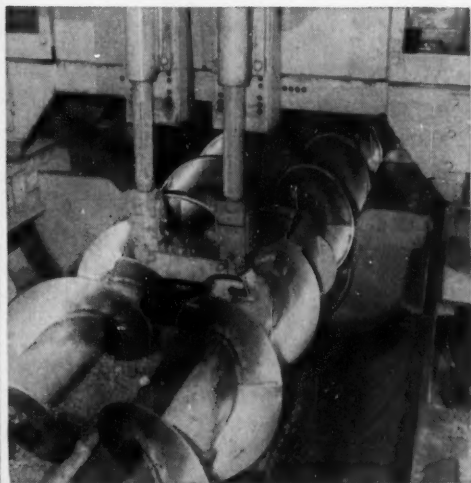
# DUAL COAL AUGER

increases profit...

mines low seam coal...

increases recovery...

**AUTOMATIC COUPLING AND UNCOUPLING OF AUGERS** take place from operators' positions by means of automatic latches. Machine positions augers for fast coupling.



Salem's powerful, new Dual brings low seam coal into the profit class by increasing practical boring depth to 200 feet (100% increase over previous equipment), handling augers from 18" to 30" diameter with only minor machine adjustments, and cutting straight and true in seams only inches thicker than the augers. Coal feeds back along both augers, maintaining the consistency of the size cut. Coal is cleaner and recovery is 50% higher. Your profit is higher. The Dual, like all Salem coal augers, is self-moving. It stores 300 feet of augers in racks on the machine. The operator's view of the highwall is unobstructed.

The Salem Dual is an entirely new concept in coal recovery drills. Investigate it today. Write for Salem Bulletin CR-D61. It gives complete information.

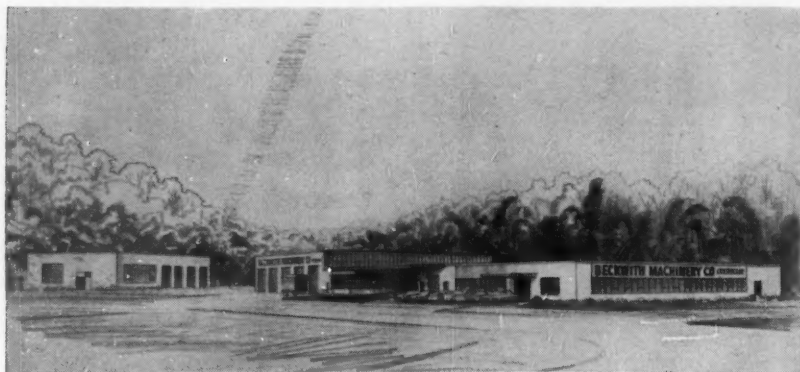
See Salem's Dual Display at the Coal Show • Booth 1708



THE **SALEM** TOOL COMPANY

SOUTH ELLSWORTH AVE. • SALEM, OHIO





● Beckwith Machinery Company, an East Liberty landmark for 32 years and a Pittsburgh concern for 54, has just completed re-location of its earthmoving equipment dealership to Route 22 East of Pittsburgh.

For the past two weeks, literally thousands of tons of machinery, equipment and parts have been moving from Hamilton Avenue to the new site in Franklin Township, 1 mile east of Murrysville. Now Beckwith, oldest Caterpillar dealer east of the Rocky Mountains, is serving contractors, coal strippers and other users of earthmoving equipment from its new 17.5 acre location.

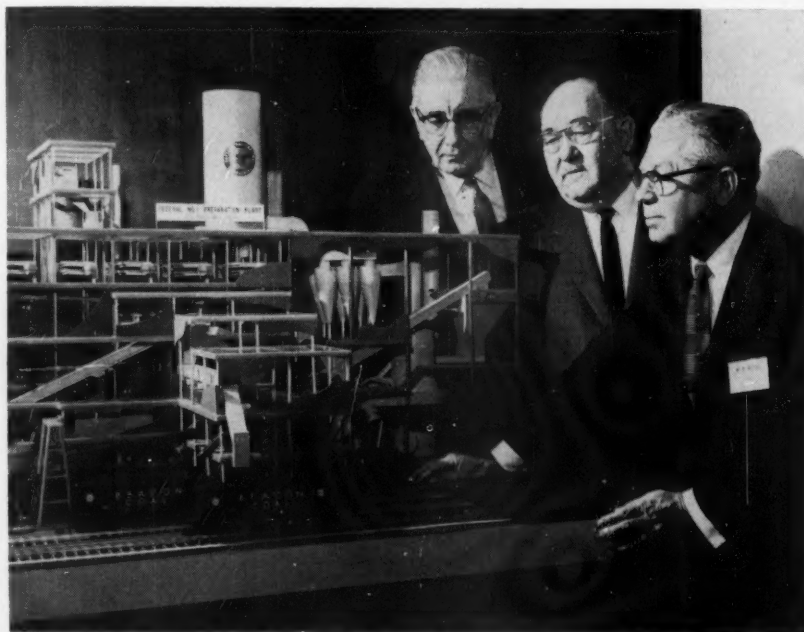
Designed by Pittsburgh architects Deeter & Ritchie, the building is 375 feet long and 135 feet wide and is sheathed with annodized aluminum. It is departmentalized to serve the needs of Beckwith Machinery's expanded offices and its Parts and Service Departments. Administrative offices occupy 12,500 square feet of space with 17,500 square feet being devoted to the Service Department and 20,000 square feet to the Parts Department. A driveway, 50 feet wide, circles the building and connects with the apron of the 100-foot long customer loading dock located off the Parts Department.

A second, smaller building serves as the Automatic Weld Shop. This unit is equipped with several movable cranes with lifting capacities of eight tons and contains 10,000 square feet. It is devoted exclusively to the automatic re-building of tractor undercarriage components. In addition to selling and servicing track type tractors, diesel engines,

tractor-loaders, scrapers and motor graders, Beckwith is also a dealer for Bucyrus-Erie Company shovels, cranes and draglines.

The firm was founded on Pittsburgh's North Side by J. S. Beckwith, father of the firm's current president, Geo. N. Beckwith. Since its founding in 1907, the firm has extended its operations to Bradford, Clearfield, Erie and Somerset, Pa., as well as Clarksburg, W. Va. The new location will serve Beckwith Machinery customers throughout the southwestern Pennsylvania area.

● The Utah-Wyoming Coal Operators Association reelected its present officers and directors April 5 in Salt Lake City. Earl J. Evans, vice president and controller, Royal and Spring Canyon Coal Companies, was reelected president, and H. J. Schultz, manager, Western Coal Mining Co., vice president of the Association. Directors, in addition to the officers, who will continue in office are: W. J. O'Connor, president and general manager, Independent Coal & Coke Co.; G. E. Sorensen, president, The Kemmerer Coal Co. and Gunn-Quealy Coal Co.; W. W. Clyde, president, Knight Ideal Coal Co.; Walker Kennedy, president, Liberty Fuel Co.; Grant A. Fougler, treasurer and assistant general manager, Lion Coal Corp.; and Oscar A. Glaeser, president, United States Fuel Co. Reappointed to office were: T. J. Canavan, executive secretary and treasurer; Mrs. Clara Outsen, assistant secretary, and D. A. James, vice president, Liberty Fuel Co., assistant treasurer of the Association.



Eastern Gas and Fuel Associates executives examine model of new coal preparation plant at a meeting of 75 of the company's top coal sales and operating personnel in Pittsburgh. The preparation plant, now under construction at Eastern's Federal No. 1 mine, near Fairmont, W. Va., is part of a \$9,400,000 capital improvement program under way in 1961. Slated to be in operation in early 1962, the plant will be able to process 12,500 tons of steam coal per day. It includes heavy media washer, diester table, and froth flotation equipment. Left to right: Harold J. Spear, vice president in charge of sales; H. John Harper, vice president in charge of mining operations; and W. B. Ross, vice president and general manager of Eastern's coal division.



For  
**Lowest Cost  
Stripping**

BOOMS UP TO 225 FT. — BUCKETS  
UP TO 25 YDS. — with either Diesel  
or Full Electric Power.

Uncovering **1,000 - 800 - 500 tons** a day —  
removing **50 - 60 - 80 ft.** of overburden

**You get MORE YARDAGE AT LOWER COST** when you put a Page uncovering your coal. See actual records of Page Walkers stripping at a profit, where smaller machines lost money (we will be glad to send you some.)

You can buy Page Walkers with booms up to 225 ft. — buckets up to 25 yds. — with either Page Diesel or Full Electric Power.

**They have the SPEED.** Page Walkers swing unusually fast — have a correspondingly fast hoist line — quicker cycles and more yardage.

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Phone GLadstone 5-3658

For High Production and Lowest Operating Costs --

**NOTHING** equals this **PAGE 700 series**  
SINGLE DECK WALKING DRAGLINES

## Do You Know?

● Great intellectual ability is where you find it, John M. Stalnaker, president and director of the National Merit Scholarship Corporation, said in 1961 Walter V. Bingham Memorial Lecture given at the Carnegie Institute of Technology in Pittsburgh. It is not possible to predict, he has found, from a parent's occupation and economic background whether or not his child will have unusual mental ability.

"The public has a false image of the very bright student," Mr. Stalnaker said. They see him as a rather peculiar, introverted type — perhaps smaller in physique than the average, somewhat antisocial and probably rather narrow in his interests.

High school students selected as Merit Scholars show that "the brainy can be brawny, too." Gifted young persons generally are taller heavier, and physically and mentally healthier than those of average intelligence. They have a greater interest in people, less of a tendency to withdraw from social situations and show more sophistication and greater self-confidence than the average person. They are less tense, less anxious, less given to feelings of insecurity or depression.

Another mistake made by the public, in Dr. Stalnaker's opinion, is the overemphasis placed by parents, teachers and even the students themselves on the IQ. The IQ is overrated, Mr. Stalnaker said.

The pupil, the teacher and the parent should put their attention not on IQ but on results, he advised. The burning desire to excel, to be first, to be best can wisely be traded for a dozen IQ points any day. In every aspect of life, it is what one accomplishes that counts, not what his unused intelligence is, or what he might have done under other circumstances.

Teachers and parents should not discourage students from trying to excel because they have low IQ, Mr. Stalnaker said.

## HERE AND THERE IN THE COAL INDUSTRY

● Four employees of southern West Virginia mines of Eastern Gas and Fuel Associates have been cited for more than 40 years mine employment without a lost-time accident.

They have been recommended to receive Joseph A. Holmes' Safety Awards, which go annually to miners with outstanding safety records. The men are: (See photos below)

Arthur P. Stevenson, foreman presently watchman at Eastern's Statesbury No. 9 mine at Helen, W. Va. He has worked 45 years without a lost-time accident. Mr. Stevenson, who lives at 503 Worley Road, Beckley, started as a miner in 1916 with the U. S. Steel Coal Company in Gary, W. Va. He joined Eastern in 1943 and was connected with the company's Stanaford, Kopperston, and Statesbury mines.

James Spangler, of Beckley, has worked as conveyor boomman and hand loader. He has been employed in the mines for 45 years without an accident. He started in 1916 and worked at Crab Orchard, Rock Springs, and New River Company, Cranberry, W. Va. He joined the present company in 1929 and was

connected with Eastern's Statesbury 11 mine at Helen, W. Va.

Leonard Meade, of Wharton, W. Va., a wireman, has been mining coal for 44 years without a lost-time accident. He joined Eastern in 1956 and is presently employed at the company's Wharton No. 2 mine in Barrett, W. Va. Previously he worked in mines at Cora, Logan County; Blocton, Mingo County; Naugatuck, Mingo County; Ethel, Logan County; Rossmore; and Stirratt.

Stratt Rash, of Bim, W. Va., has worked as a coal loader, driller, machine operator, and belt operator for 43 years without a lost-time accident. Joining Eastern in 1949, he is presently employed at the company's Wharton No. 2 mine, Barrett, W. Va. He started in 1918 with the West Virginia Coal and Coke Company in Omar, W. Va.

The Holmes safety program is sponsored by the United States Bureau of Mines, the National Coal Association, United Mine Workers of America, Southern Coal Producers Association, and the Bituminous Coal Operators Association. Winners receive certificates and a reflective decal for their safety hats.



Arthur P. Stevenson  
Eastern Gas and Fuel  
Associates



James Spangler  
Eastern Gas and Fuel  
Associates



Leonard Meade  
Eastern Gas and Fuel  
Associates



Stratt Rash  
Eastern Gas and Fuel  
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### **Coal comes quicker with increased working light**

Now Edison Model S Electric Cap Lamps give you *more* working light than any other cap lamp.

They're throwing *more* light on the subject of man-hour productivity, too. This is the safe lamp for the miner . . . the dependable lamp for you.

Miners themselves come up with the best reasons why: 15% increase in working light . . . small lightweight headpiece . . . 400 hours bulb life in each filament . . . longer battery life . . . clear, sharp spot every time . . . and so it goes.

As for charging: no new charging racks required . . . takes either constant current or constant voltage . . . over-charging or under-charging won't affect battery life . . . never a labor-scheduling problem.

Such an increase in working light can cast a favorable image on your operating sheet. Ask your MSA Representative about it. Mine Safety Appliances Company, Pittsburgh 8, Pa. In Canada: Mine Safety Appliances Company of Canada, Ltd., 500 MacPherson Avenue, Toronto 4, Ont. **MSA**





Fig. 1. Aerial view of surface plant.

## Dawdon Coal-Preparation Plant

**A description is given of the new 400 T.P.H. coal-preparation plant at Dawdon Colliery in the No. 2 (Mid-East Durham) Area, N.C.B., Durham Division, England.**

### PART I

A coal-preparation plant, which incorporates in its design some entirely new developments, is one of the interesting features of the reconstruction work being carried out at Dawdon Colliery. This colliery, situated on the cliff tops of the Durham coast near Seaham is some 60 years old and was originally owned by Londonderry Collieries Limited. The bulk of its output was shipped to the South of England from nearby Seaham Harbour.

Before Nationalisation, output had reached a figure of approximately 600,000 tons per annum, the

coal being prepared for the market in a 100 T.P.H. Birtley dry cleaner and a Rheolaveur trough washer for small sizes.

After Nationalisation, it was decided to increase the productivity of the colliery and to raise its output by half, i. e. to approximately 900,000 tons per annum. Accordingly, a large reconstruction programme was put in hand.

Underground, a new level locomotive roadway was driven to connect three central loading points with a new pit-bottom, coal being hauled in 3-ton minecars by 100 h.p. diesel

locomotives.

Complete electrification has been carried out on the surface including the installation of two tower-mounted winders (one with skip) and a new fan. A lamp room and administration block have also been completed.

A new coal-preparation plant was essential to handle the increased output, but it was decided to retain the existing dry cleaner to give maximum flexibility to cope with the stringent marketing requirements.

The site at Dawdon is congested

and it was by no means a simple job to carry through the surface work whilst maintaining output. The fact that this was carried out to schedule speaks highly for the organisation and planning of the scheme and for the liaison between the N.C.B. and the various contractors involved.

#### Coal-preparation

Fig. 3 is a plan of the surface layout of the colliery, showing the position of the plant in relation to the shafts, and Fig. 6 is the flowsheet for the plant. The description of the method of coal preparation can be followed by referring to this drawing.

#### Raw coal handling

Run-of-mine coal from the new skip winding plant is delivered by an apron feeder to No. 2 belt conveyor, which conveys the product to the screening and inspection house. Foreign coal may also be delivered

to No. 2 belt conveyor by means of a track hopper, vibro feeder and No. 1 conveyor. A circular electro-magnet is situated at the head end of No. 2 conveyor for the purpose of removing tramp iron from the stream of coal. The coal then passes to a run-of-mine screen. This screen has two suspended bodies, the upper body is fitted with 6 in. diameter perforated plate, whilst the lower body is provided with perforated plate having 1 in. perforations. The purpose of this lower deck is to remove a certain quantity (in the region of 50 to 80 t.p.h.) of small coal which will be separately treated in the existing dry cleaning plant. The perforations in the lower body may be changed in the future to suit market requirements.

The plus 6 in. material passes to an inspection belt where any obvious foreign material is removed by hand, and delivered by chutes

to minecars. The product remaining on the belt is chuted to a jaw crusher, which reduces the coal to minus 6 in.

The material which passes over the lower deck of the run-of-mine screen (predominately 6 in. to 1/2 in., but with some undersize material) is chuted to the raw coal bunker feed conveyor (No. 5). At this point it is joined by the crushed coal from the jaw crusher by means of No. 3 conveyor. The undersize material from the screen referred to above is collected, and fed to No. 4 conveyor. This conveyor delivers the coal via a conveyor system to the existing dry cleaning plant. It is also possible to transfer this small raw coal to rail wagons by means of a small loading hopper.

Provision is also made to pass the whole of this small coal to No. 5 conveyor so that the whole of the

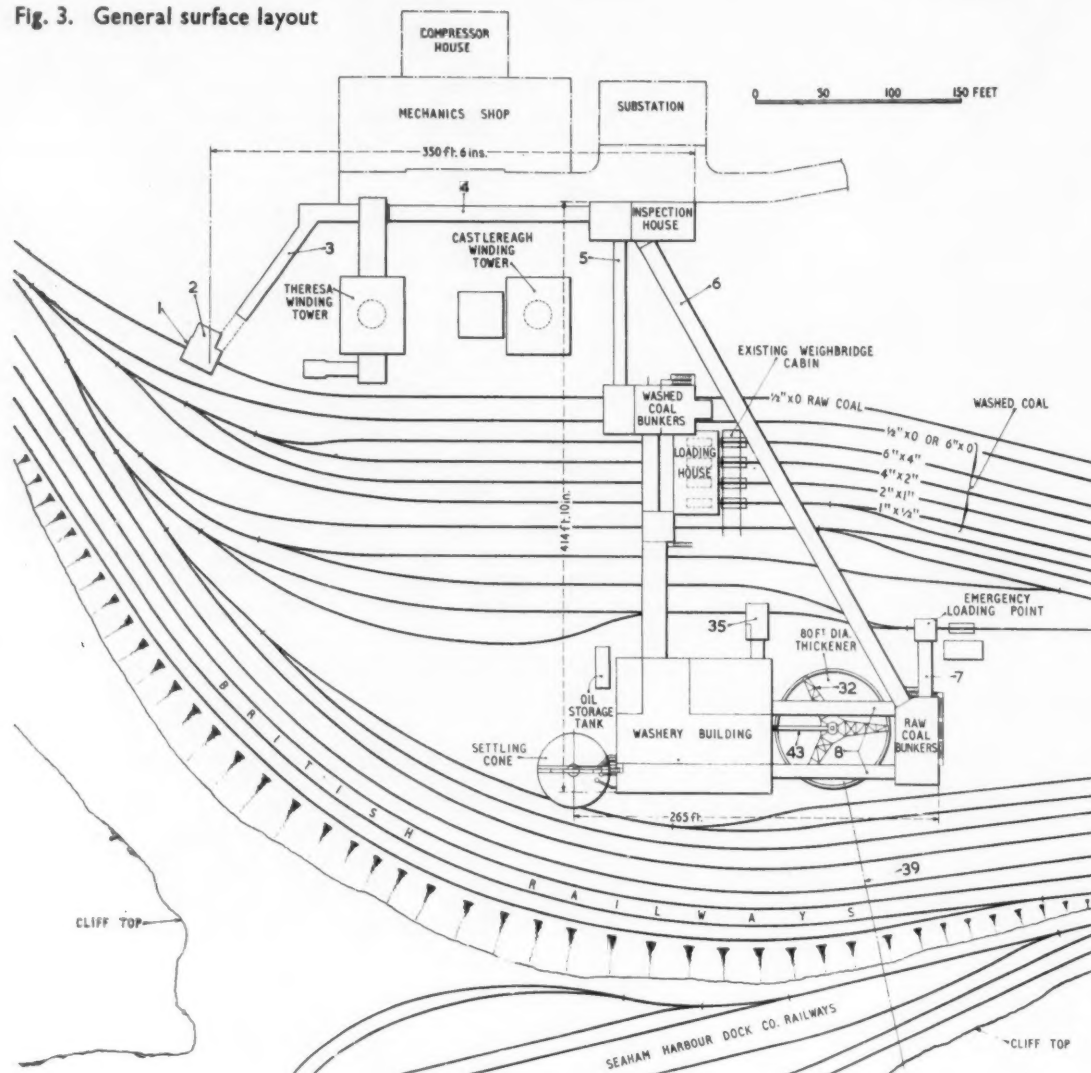
(Continued on Page 17)



Fig. 2. General view looking north-east



Fig. 3. General surface layout



KEY TO FIGS. 3 &amp; 7 (Fig. 7 will appear in following issue.)

Item No.	Description	Item No.	Description
1	Track hopper grids and supports, etc.	26	36 in. boom loader
2	Vibro feeder and outlet chute	27	Slurry screens
3	No. 1 conveyor	28	Scalping screen
4	No. 2 conveyor	29	F.F. cells and conditioners, etc.
5	No. 4 conveyor	30	Froth piping and launders
6	No. 5 conveyor	31	ACCO rotary vacuum disc filter (R.H.)
7	No. 7 conveyor	32	80 ft. diameter thickener mechanism
8	Nos. 8 & 9 conveyors	33	Shale chute
9	ACCO SJL 80/8 washing unit (right hand)	34	No. 15 conveyor
10	Washbox supporting structure	35	Shale bunker door gear
11	H.M. chute to conveyor	36	Washbox blower and piping
12	Middling screen	37	Main pumps and piping
13	Heavy middlings crusher	38	Clarified water pump and piping
14	Middlings launder	39	Diaphragm pump and piping
15	Light middlings chute	40	Drainage pumps and piping
16	Light middlings crusher	41	Vacuum and filtrate piping
17	Light middlings scraper conveyor	42	Filter blowers and piping
18	Washbox discharge chutes	43	Tailings pipings to thickener
19	W.C. screens and structures, etc.	44	Filter drain and overflow piping
20	42 in. W.C. elevator	45	Conditioner drain pipes
21	48 in. W.C. scraper conveyor	46	Washbox and elevator drains
22	Centrifuges, feed and discharge chutes	47	Service water piping
23	No. 10 conveyor	48	Main sump drain and overflow
24	Paddle mixer and structure	49	W.W. chute underflow piping
25	No. 11 conveyor	50	Fire pump piping

(Continued on Page 17)

CATERPILLAR

*Facts from your dealer*



# ***CHEAP DIRT?***

**1,000 years ago this was the cheapest way to move dirt. Today, modern machines move it at lowest cost. Question: How modern must machines be for lowest cost earthmoving?**

When are your costs really lowest—when you use “paid for” three or four year old machines—or new Caterpillar machines?

The older machines may be delivering good production. But Caterpillar has compressed into the past four years many equipment advances—power shift transmissions, pressure ratio controlled turbochargers, more power, more capacity—all adding up to new levels of machine performance. See, on the following pages, how these and many other improvements provide today's lowest cost earthmoving.

## CHEAP DIRT

**How modern must your equipment be for lowest cost earthmoving?**



Suppose you now own a front end loader—a 977 Traxcavator, almost four years old. You have seen the newest 977s in action, noticed the larger bucket capacity and the speed of the power shift transmission. And you start thinking.

It would appear that the faster loading cycles with the new power shift machine could earn more. Also, the new maintenance features like lifetime lubricated rollers and dry-type air cleaners look like time and money savers. But there are other factors to consider.

The old loader is paid for. It still is producing without problems. And it still has some depreciation value left. So how can you justify replacing this machine which apparently doesn't owe a cent? It's time to do some figuring.

Like most good businessmen, you keep a set of cost records. This, of course, is necessary since your machines work steadily during most of the construction season, and this is the kind of business where often a ¼¢ per yard can mean the difference between being a successful bidder or a bankrupt contractor.

You are familiar with the simple formula for computing true machine costs: Owning costs (depreciation, interest, insurance, taxes) plus operating costs (fuel, oil, repairs, operator's wages, etc.) plus down time minus trade-in value equal true costs.

The only valid way to compare production is to find out what each machine can do under the same conditions.

On Interstate Route 55 in Illinois an old 977 Series D worked alongside a new 977 Series H, loading broken concrete into 10-yard dump trucks. A time study was made and trucks were weighed. Loading costs were figured to a fraction of a penny.

Weighed truck loads showed that both machines averaged about 7,600 pounds per bucket load. The large irregular shape of the broken concrete accounts for the fact that the new machine's larger bucket did not show a better advantage.

Here's how the time study looks:

### AVERAGE CYCLE TIME

OLD 977 SERIES D	.53 min.
NEW 977 SERIES H	.39 min.

Now that the average cycle time and the average bucket load have been determined it's easy to figure hourly production. Based on a 40-minute working hour, the old 977's production is 286.8 tons and the

new Traxcavator's 389.7 tons—a 35.9% advantage for the new machine!

Next step is to estimate the hourly owning and operating costs of the two Traxcavators. The new machine's initial cost is slightly higher due to machine improvements during the past four years, so a higher depreciation must be allowed. On this job, here's how the *machine* costs compare:

OLD 977 SERIES D	\$ 8.96 per hour
NEW 977 SERIES H	\$10.06 per hour

By dividing tons into dollars the difference in loading cost per ton can be determined:

OLD 977 SERIES D	31.2¢	
NEW 977 SERIES H	25.8¢	5.4¢

5.4¢ a ton difference builds up fast. On this job, it adds up to \$21.00 an hour—\$4,200 a month—twenty 10-hr. working days! Since high production loading is a major factor, a decision to buy the new machine here is obvious.

But what about applications where the new machine's productivity partly depends on other machines?



### PUSHLOADING

A push tractor's profitability has to be measured in terms of what the scrapers on the job are producing.

A contractor in the South learned some things about old versus modern pushers when he had a time and weight study made on his job last year.

He owned an old 190-plus HP crawler tractor equipped with torque converter drive. He wondered if a new 235 HP D8 with power shift transmission would be a good investment for him. Again it was a matter of combining production and costs to determine which machine gave him the lowest cost per cubic yard.

His job involved moving red clay with a density of 2,850 lb. per bank cubic yard. His own operators ran the equipment and he took part in the time study and weighing of loads in the 18-yard scrapers. Here's how the study looked:

	OLD	235 HP D8
Pushloading cycle time (minutes)	1.29	1.03
Loads pushed per 50-min. hour	38.8	48.5
Ave. bank yard per load	17.4	19.2
Hourly production	675	933
Hourly owning and operating cost (pusher only)	\$11.89	\$13.10
Pushing cost per bank cu. yd.	1.76¢	1.4¢



So with the new D8, this contractor gained an extra hourly production of 258 yards at an additional cost of only \$1.21 per hour. Overall results: 38% more production at 21% less cost per yard.

This advantage resulted from the faster action of the power shift transmission and the greater power that gained an extra 10 loads an hour and helped pack in another two yards per load.

The advantage of modern equipment is easily proved with recognized high production machines. But what about on less demanding tasks?



### CRAWLER-DRAWN SCRAPERS

There are probably more crawler-drawn scrapers that are out-dated but still in use than any other type of earthmoving equipment. They are still used because they have been depreciated to zero value years ago and because of their supposed economy. A western contractor learned some surprising facts when a careful time and weight study compared his old 14-yd. scraper against a new 18-yd. Caterpillar unit.

Both scrapers were pulled by the same 225 HP D8 Tractor, under the same conditions. The new scraper hauled 6.5 more bank yards per trip and de-

livered 45 more bank yards per 45-minute hour—at 10% less cost per yard!

Although the new unit is only rated 28.5% larger than the old scraper, it hauled 52% more dirt by actual weight. The more efficient design of the new LOWBOWL scraper accounts for this extra yardage beyond increased rated capacity.

On a 20,000-yard job, the old scraper would need 20 days to move the dirt. The new scraper could be through in less than 14 days—ready to move on to another job for increased earning potential, both for itself and for its prime mover.

Another way of looking at it is in terms of actual income. Suppose the dirt went for the low figure of 30¢ per yard. Here's an earning statement on the two units:

	OLD	NEW
Hourly production (bank cubic yard)	103	148
Gross income/hr. @ 30¢/yd.	\$30.90	\$44.40
Hourly owning and operating cost (machine costs only)	\$11.96	\$15.56
Gross earnings/hr.	\$18.94	\$28.84
Advantage		\$ 9.90

In figuring the hourly cost of the old scraper no charge was made for depreciation. The D8 hourly cost was the same for both spreads.

By extending the earning advantage over a yearly (2,000 hour) period, the extra earning potential of the new scraper would reach over \$18,000.

### WHEN CONSIDERING TRUE OWNING AND OPERATING COSTS...

It's obvious that all machines being compared should be figured the same way. Machine costs for any make of machine would include an owning and operating cost breakdown similar to the one shown in the accompanying chart.

Original price, the useful life, the cost of fuels, lubricants and tires, the cost of repairs and the operator's wages all have an important bearing. To arrive at hourly costs, the total costs in each cost category that would occur before anticipated trade-in must be estimated. True costs per hour are determined by dividing these totals by the useful life of the machine. Not included in owning and operating costs are overhead charges which are accounted for as "business expense."

This system of cost computation was used for all the machines in the studies above. Naturally, costs will vary by section of the country and by the type of work being done. For this reason, it is better to use your own individual machine cost records.

As the following page reveals, our specialists are always available for helping you arrive at a true machine cost analysis for your job.

	Hourly Cost
<b>OWNING COSTS</b>	
Depreciation	_____
Interest, Insurance, Taxes	_____
<b>OPERATING COSTS</b>	
Diesel fuel	_____
Gasoline	_____
Lube oil (crankcase, transmission and final drives)	_____
Hydraulic oil, steering	_____
Filters	_____
Grease	_____
Tires	_____
Repairs, including labor	_____
Operator's wage	_____
<b>Estimated Total</b>	_____

## We can help you measure how modern your equipment really is

### WEIGH LOADS

"Eyeballing" a load can lead to costly mistakes when you're estimating the production of a scraper. You can know *precisely* how much a rig is hauling. Ask us to help weigh loads on your own job—and come up with accurate measures of scraper or pusher performance that you can trust.

### TIME STUDIES

A carefully-conducted time study can add new depth to your knowledge of any machine's performance. Combined with an accurate weighed-load analysis, a time study of equipment you own or consider buying will give a true measure of the machine's production. Call on us for specialized help.

### COST RECORDS

Complete cost records on each machine you own are vital to knowing your true cost per yard. Our representatives can help personally. Or simply write or call for a free copy of our daily and monthly cost record books. They provide an easy-to-use system for gathering and keeping machine cost data.



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Route 60 East, Charleston, W. Va.  
4010 Emerson Ave., Route #2, Parkersburg, W. Va.

CM-13

(Continued from Page 12)

pit output may be sent to the coal washery.

No. 5 conveyor transfers the coal by means of a feed box to a reversible conveyor (No. 6) which in turn feeds either of the two 500 ton compartments of the raw coal storage bunkers, which are fitted with spiral anti-breakage chutes.

By-pass outlets are installed in each of the two compartments, whereby coal may be outloaded by means of conveyor No. 7 to rail wagons—this in the event of a breakdown in the coal-preparation plant. The coal may then be reintroduced by loading through the track hopper already mentioned.

### Washing Equipment

The main washing units comprise two identical ACCO SJL.80 washboxes having eight compartments and three elevators. Each box deals with a 6 in.-0 size raw coal feed at the rate of 200 tons per hour which it separates into three products—clean coal, middlings and shale.

From the base of each compartment of the raw coal bunkers, the coal is delivered direct to each washbox by means of vibro feeders, and Nos. 8 and 9 conveyors. Belt weighing machines are situated on each of these conveyors to indicate the tonnage being delivered to the washboxes.

An entirely new development, patented by ACCO, and known as Automatic Feed Regulation, is incorporated in the raw coal feed circuit. Dependent upon the shale content in the feed, the tonnage of raw coal fed to the washbox can be automatically controlled, in order that the washbox will continue to operate at its optimum capacity. Although under certain conditions this will reduce the capacity to below the average, on other occasions the machine will operate at considerably more than average capacity, in view of the more favourable feed conditions.

The feed regulation can be applied either to a single variable in the feed or can be associated with a multiplicity of variables; in other words

detectors are situated at various points in the washbox indicating which particular factor is becoming the bottle-neck, and automatically varying the feed accordingly. In addition, the feed regulation can be operated by integrating two variables so that the cumulative effect is the factor which determines the amount of feed regulation which will take place.

This form of control, which ensures continuous operation at opti-

mum capacity, with a regular quality of washed products, enables other features to be incorporated in the plant, such as automatic control of air and water supply, an alarm system and recording devices, where these are considered advantageous.

Shale is discharged at the feed end of each of the ACCO automatically controlled washboxes, and delivered by elevators and chutes to the shale conveyor (No. 15) which in turn delivers the product to rail



Fig. 4. Nos. 11 and 13 conveyors (washed coal)

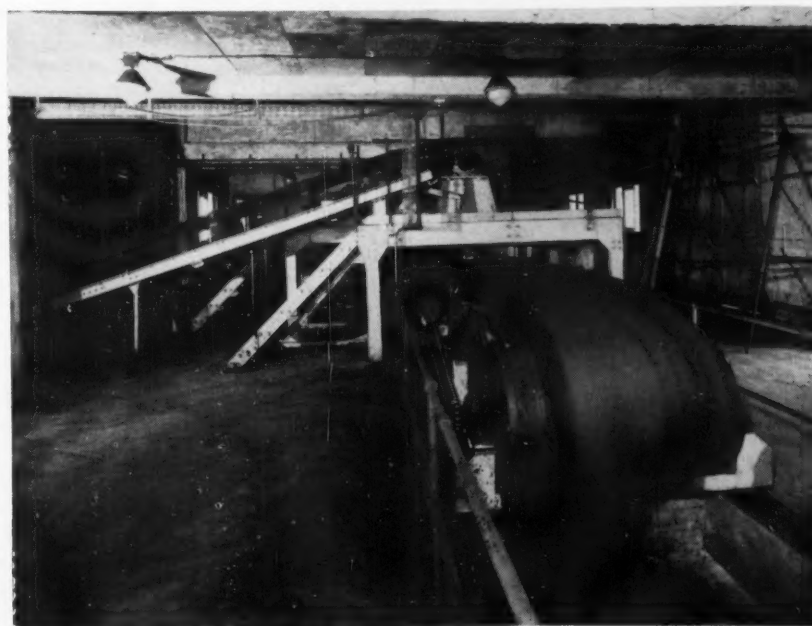


Fig. 5. Washed coal shuttle belt conveyor



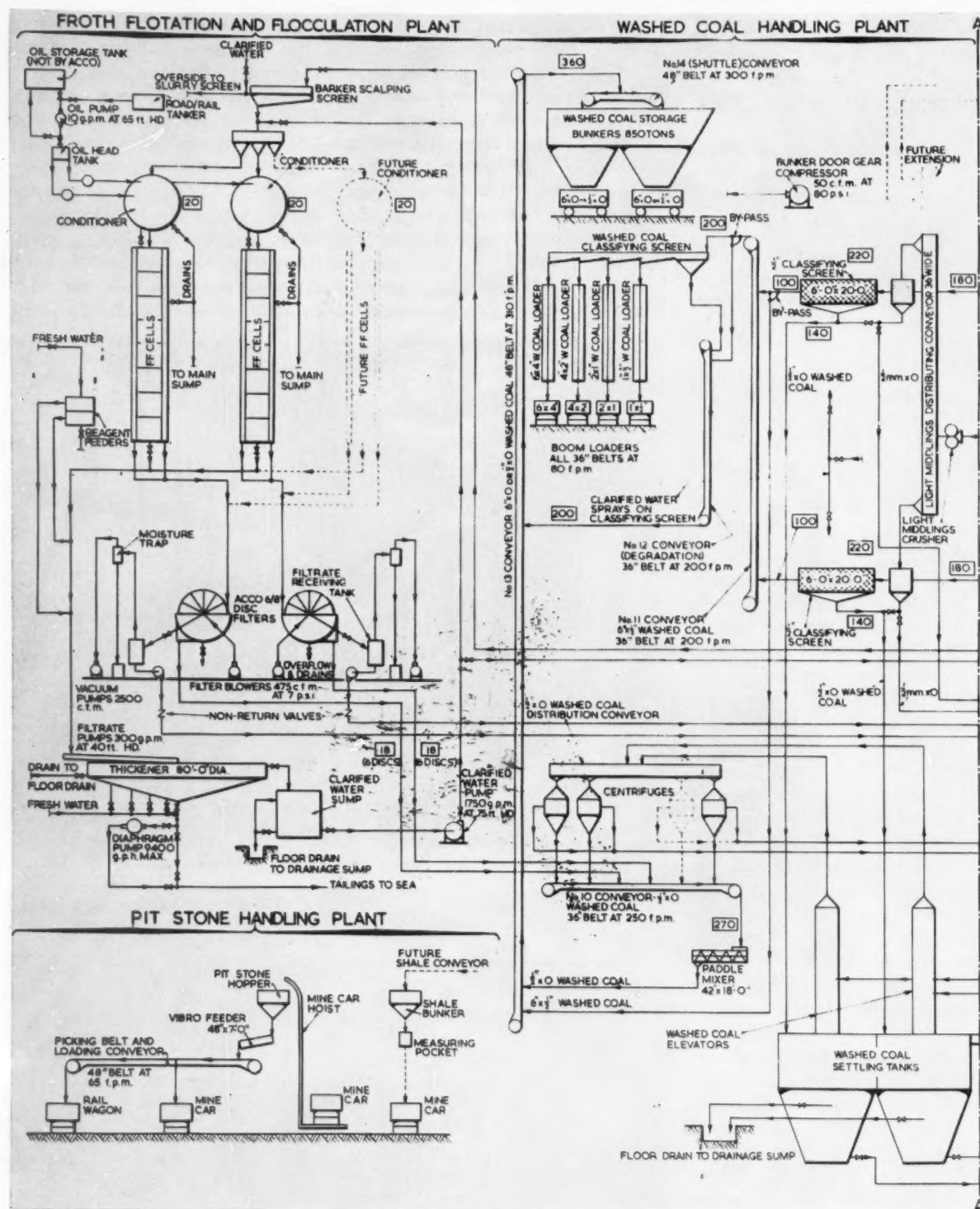


Fig. 6 (above and opposite). Flow diagram

wagons through a small loading hopper.

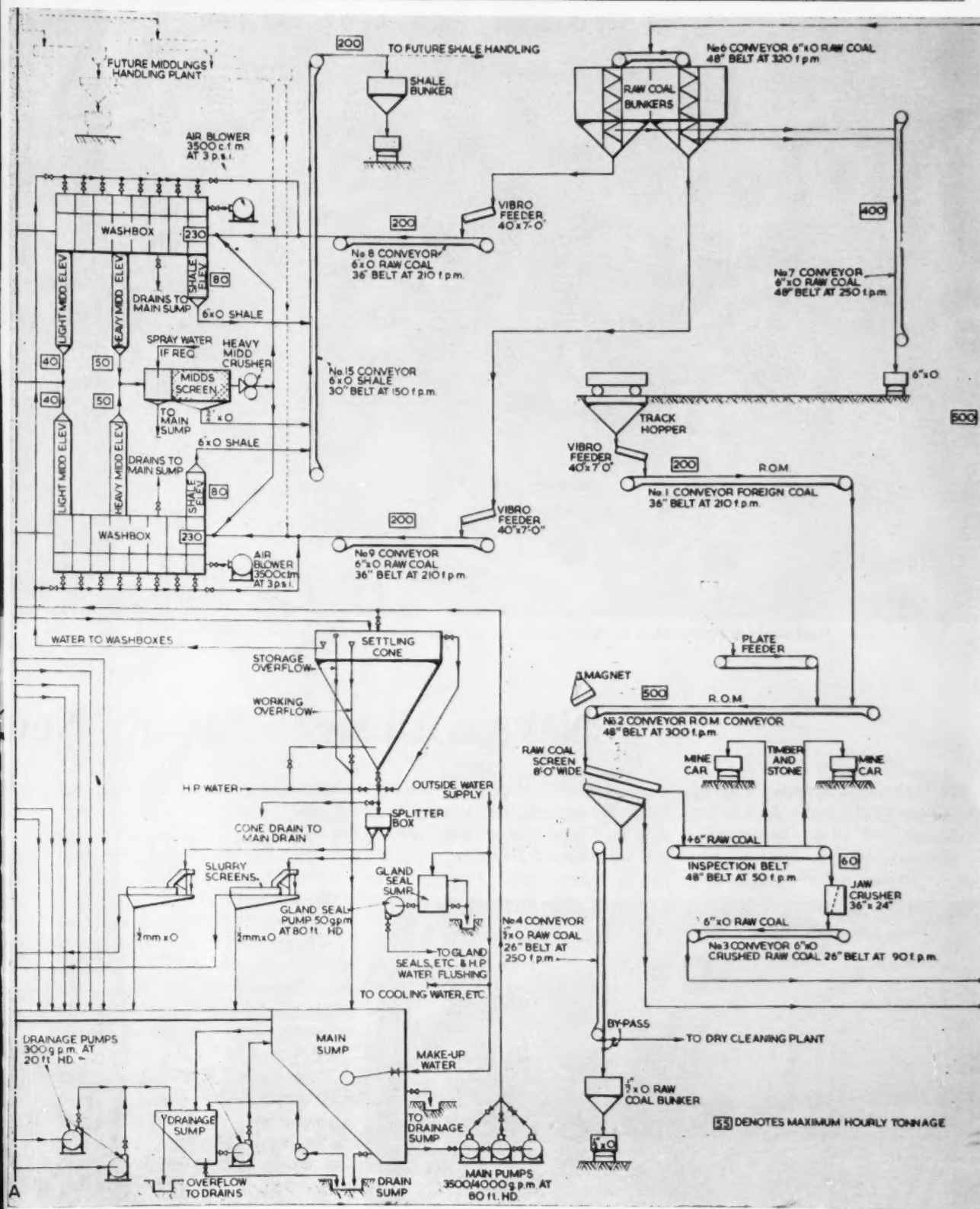
"Heavy" middlings are discharged from the washboxes by means of the second elevators, the product being screened at  $\frac{3}{4}$  in., the oversize being crushed, and recir-

culated to either one, or both washboxes, whilst the undersize is delivered by chute to the shale conveyor.

"Light" middlings are discharged by means of the third elevators, and are crushed to minus 2 in., and fed by scraper conveyor either into one

or both primary washed coal classifying screens.

By this means, a separation is achieved in the washboxes at a suitable low gravity in the coals plus 2 in. to permit approximately half of that size of coal to be extracted



as a domestic fuel, and blend the other half with clean coal and minus 2 in. middlings to make a gas coal.

The plant has been designed to

permit the crushed middlings from the third elevators to be returned to the washboxes for rewashing, or delivered to a loading point outside

the washery for use as a separate product should this be needed in the future.

(To be continued next month)



Haul roads are watered down by Yuba-Southwest water wagon pulled by a Cat DW20.

## Navajo Mine To Supply New

Production of 11½ million tons of coal a year (4,200 tons a day) is the initial goal of Utah Construction & Mining Co.'s strip mine on the Navajo Indian Reservation south-

west of Farmington, New Mexico. Part of a multimillion dollar power project, Navajo Mine will supply coal to Arizona Public Service Company's Four Corners Power Plant,

under construction two miles east of Utah's lease area. A major part of the Power Plant project is the construction of a six million yard earthfill dam which will create a 1,200-acre cooling pond.

The 350,000 KW generating plant is scheduled to go into service early in 1963. To meet this deadline, the 6,600-foot long dam will be completed next December. Water will be pumped from the San Juan River for 394 days to fill the reservoir.

Stripping will begin in late 1962 on Utah's 24,000 acres of leased Tribal Lands. The 23-mile long plot varies in width from 1 to 3 miles. Overburden depths range from 20 to 120 feet. Most of the coal lying under less than 20 feet of cover is oxidized and not considered fit for fuel.

The main coal seam has a regional



A general view of the dam site, looking north. Earth-moving goes on around the clock, six days a week.





Fill on the dam is disced before compaction. In the background, excavation for the dam core is under way.

## 350,000 KW Generating Plant

dip of three per cent to the southeast and is from 8 to 20 feet thick, average thickness 13 feet. In some areas it is underlain by other coal beds.

Under current plans, overburden will be blasted and spoiled by a dragline with 250-foot boom and 40-yard bucket. Studies are being conducted to determine the most economical means of loading the coal and transporting it to the generating plant.

Construction activities are now in full swing, as can be seen in the photographs accompanying this article. At this time there are more than 300 men working on the power plant foundations, cooling pond dam and river diversion point.

Mr. Ray B. Thorne, Ebasco Services, Inc. Project Manager, is in charge of construction for the Four

Corners Power Plant. Ebasco Services, Inc. has been retained by Arizona Public Service Company as engineers and prime contractor for the power plant. Mr. Boyd C. Paul-

son is project manager of Utah's part in these construction activities, primarily the dam and diversion works. Navajo Mine Manager is A. F. Geiger.



One of 24 Caterpillar DW20 Tractors—this one with a 482 Scraper—hauls waste from the dam core while another returns to the site.

## Picking The Maintenance Man

In the paragraphs to follow are ten suggestions for coal company executives in picking men for maintenance work. Each of them comes from the every day experience of practical operations; from men who have found these pointers reflected in dollars and cents. Here are their suggestions.

(1) Pick a man who has a natural "fix-it" bent; one who takes pride in his ability to improvise urgently needed repairs, to plan ways of substituting when there isn't time to get a new part. This individual's greatest value will be in his love for maintenance work and his pride in accomplishing the unexpected when circumstances require.

(2) A good maintenance man has to have a calm, easy disposition. Maintenance and repair work is not for the man who is hot-headed or who becomes panicky in an emergency. Steady nerves are important in the everyday functions of a maintenance man's job. The most desirable maintenance man is one who fails to get ruffled when things go wrong yet who show genuine interest in what he is doing.

(3) A maintenance man should have at least a working knowledge of oils and greases and their uses. Lubricants are of great importance in keeping the firm's equipment running and in cutting down operating costs and repair bills. This knowledge need not extend to technical skill but it should be sufficient to enable him not only to know when and how to lubricate but to have a basic understanding of the various lubricants and their uses. If an otherwise qualified man does not

have sufficient knowledge of lubricants, any lubricant manufacturer will supply the necessary information.

(4) A good maintenance man need not be too exacting as to cleanliness but neither can he be slovenly, for cleanliness is a basic principle of good maintenance. Many men who are overly fussy about cleanliness are good enough for ordinary operation but fail completely when they have to plunge in and get an emergency job done.

(5) A good maintenance man should have a reasonable educational background and, equally as important, a natural desire to read and study maintenance and repair manuals put out by the equipment manufacturers. The man who throws such literature aside on the assumption that he knows all about the subject is seldom a good maintenance man, for new ways of doing things are being discovered constantly and many old practices are being made obsolete by new discoveries. A maintenance job is no place for a man who will not study, who will not grasp at every bit of information he can find, who will not constantly seek to improve his knowledge of how to do a better job.

(6) A good maintenance man should have the ability to explain things to others; particularly if he must supervise the company's maintenance crew. Even more important he must have the ability to show others how things are done so that his knowledge of equipment usage and care can be successfully passed on to every man using the equipment.

(7) He should be handy with small tools and know how to take

care of them. The maintenance man's small tools are as precious to him as good instruments are to a doctor. The quality of his tools largely determines his ability to perform practical maintenance. If he is careless in the way he handles tools, takes care of them, or uses them, in the way he selects tools for a particular job, he is not only a bad maintenance man but a costly one. Tools, if not used most carefully soon become a heavy item of expense.

(8) A good maintenance man is often one who has become somewhat "settled in his ways," who takes things in his stride and when he must remain calm, is able to keep his composure and not make things worse because of excitement.

(9) A good maintenance man is painstaking and careful. He knows the value of minute attention to little things. Experience has taught him that maintenance is, and always will be, care and attention to the little details that make the big machinery and equipment operate smoothly.

(10) A good maintenance man is one upon whom management can depend no matter what occurs.

These pointers may suggest others to the reader but they represent those listed by experienced executives as the most important in selection of dependable maintenance men.

Good oils and greases, fine equipment, precautionary devices and other factors are useless when the wrong type of individual is chosen to put them into operation and keep them running. The maintenance man is one of the most important on the payroll!

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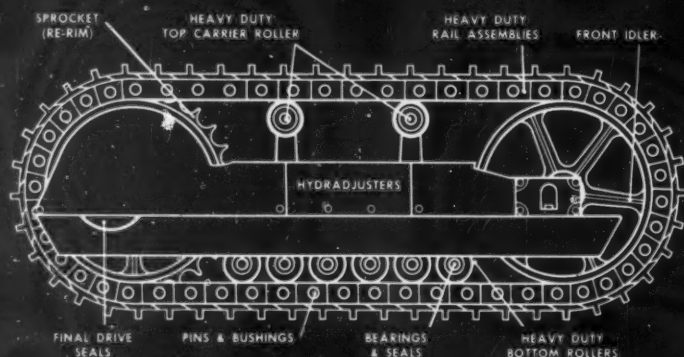
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120-B B.E. Elec. Drag, 115', 5 yd.  
111-M Marion Drag, 100', 4 yd.  
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4161 Marion 6 yd. Elec. Shovel  
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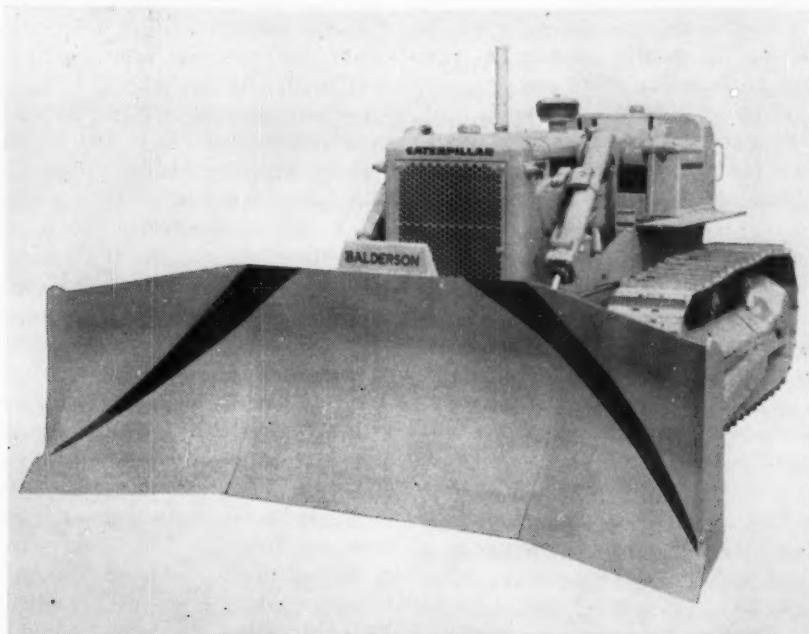
three times as much coal as straight or angling blade bulldozers, and at no more fuel cost.

The Balderson BD6U-12' blade is shown, attached to the D6B tractor. The side wings angle forward at 25

degrees for the double purpose of easily collecting a full load and holding it for long distances.

Balderson light material dozer blades increase production for coal burning utility plants and industries, are ideal for sanitary landfill operations and give greater efficiency at many light material dozing jobs.

For blades to fit machines in the field, or for complete new Balderson-Cat packages, see your Caterpillar Dealer. He can help you select the proper size equipment for your job.



Balderson BD6U-12' Light Material Handling Blade for Cat D6B Tractor. Ideal for coal burning utility plants and industries, storage and reclaiming operations at mines, and at sanitary landfill operations. Similar blades are available for all size Cat track-type tractors and both track and wheel Traxcavators, exclusively at Caterpillar Dealers.

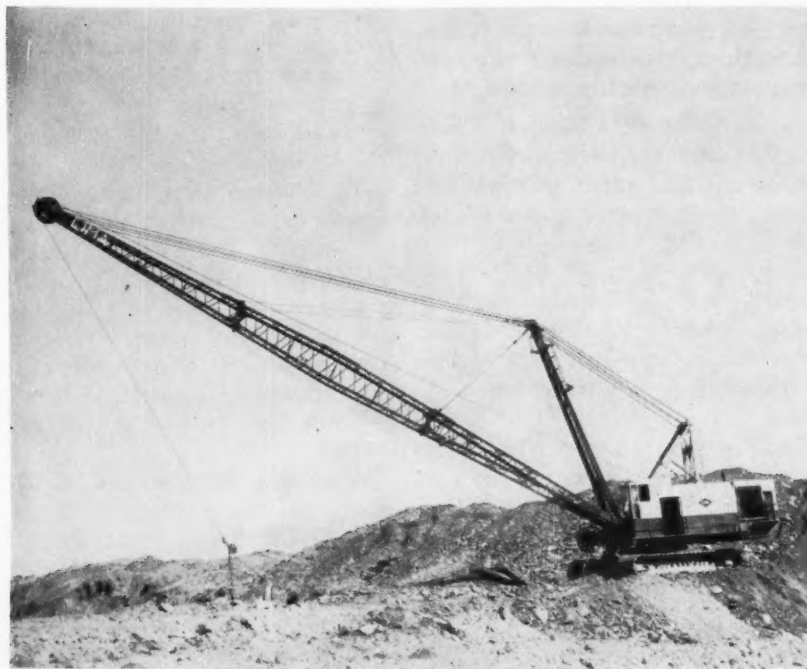
● Bill Pry is now a salesman for State Equipment Company to handle all contracting and municipal accounts in upper Allegheny County. Bill has been office manager in the Pittsburgh branch of State Equipment Company where he specialized in used equipment.



Bill Pry

Prior to joining State, Bill was with Atlas Equipment Company for eleven years working in both the parts and service departments. He has had a total of thirteen years in the construction equipment business and four years in the steel industry.

He is 35, married and the proud father of three children. He lives in Dravosburg.



Lima 2400 . . . Rice Bros. Coal Co., Philipsburg.

## That New Foreman Has To Be . . .

—Responsible. Leadership and responsibility go together on any supervisory job in a coal company organization. Any employee being considered for promotion to a supervisory position at any level should always have demonstrated possession of a sense of responsibility in getting work accomplished and doing it under harmonious relations with the men with whom he works.

—Confident. There's no place for indecision or lack of confidence on any coal company staff; where it exists in the man in charge full section results never are achieved. Confidence in one's ability to do the job ranks high on the list in considering prospective candidates for promotion.

—Understanding. Some degree of results can be achieved by a person in a supervisory position without this valuable trait but the man who has a good understanding of people and their relationships to each other always has a tremendous advantage in getting others to do things for him.

—Trustworthy. A fine sense of ethics, justice and rightness coupled with a readiness to apply these to his own conduct assure any man the ability to make certain that same trustworthiness toward him comes from others. And the latter is just as necessary toward the success of any supervisory personnel within the company set-up.

—Stable. Development of emotional maturity or self-control usually comes a little later on in life but there are some men who possess it early. They demonstrate it in everything they do on and off their present jobs. Being well adjusted makes the supervisory job an easier one to carry out.

—Quality conscious. There's no place for short cuts in modern coal company operation. The maintenance

of quality standards is a must. Directing work performance according to specifications is just as important. These are must qualities for any new foreman or supervisor.

—Competent. Whatever wealth of other qualities he may possess without this one all-important asset he sooner or later will fail in the post under consideration. Such competence is basically thorough and complete knowledge of all immediate operations over which he will have supervision.

—Able to lead. The conduct of others in the achievement of all of the procedures and tasks involved within his department requires ability of leadership. This can be developed with experience but unless there is a small amount present even before such experience arrives the end result is usually unsatisfactory.

—Energetic. Possession of both mental and physical energy gives any individual the stamina to see through any problem with which he may be confronted in his new post.

—Maintenance conscious. Even though maintenance supervision is in the hands of others each specific foreman or supervisor should be maintenance conscious with respect to his own department. The protection and care of equipment and materials with which department is concerned is a definite part of his responsibilities as the head of that section or department.

—Varied in interests. The man with a one-track mind may do his job well if that happens to be the right-of-way upon which he has concentrated but sooner or later variances will appear which will throw him completely. Such supervisory personnel seldom have the ability to work successfully with

other departments and sections within the coal company.

—Communicative. The supervisor's ability to talk and write clearly and forcefully not only makes his job easier but helps guarantee against misinterpretation of his instructions and the disastrous results which can easily follow. Today it is even advisable to require an understanding of the basic principles of communication.

—Intelligent. There is no substitute for intelligence in leaders at any level despite the one in a hundred we sometimes observe who does not possess this asset in full measure. The individual under consideration must always possess intelligence equal to or at a higher level than those over whom he will have supervision on the new job.

—Enthusiastic. Foremanship requires a spark to provide the extra drive that incites others to do more than they have to when job emergencies arise. One who is an enthusiastic individual in himself will have the ardent zeal for performance of his duties which in turn will be "catching" among the men working under him.

—An organizer. No matter how well established the routine and procedures in any given department of the company there will still arise cases where he must have the ability to organize structures within his own department. These invariably occur under circumstances which require immediate solution and do not give him time to seek outside assistance.

—Decisive. Things move at too rapid a pace today for anyone to get by without this inherent ability. The modern foreman or supervisor at any company level should always have the ability to make decisions promptly and make the right decision a great deal oftener than the



wrong one. The high cost of errors today precludes figuring any "Margins for error" in management any more.

—Willing to serve. Today's supervisor who gets the best job done with the least strain is the man who has learned how to perform services for those under his control when the occasion demands. It is a procedure often by-passed in the past and not needed during those by-gone periods. With today's average type of employee it is a definite requirement.

—A teacher. In even the most stable section of modern coal company operation there are changes being made today and the possibility of many, many more in the future. Tomorrow's foremen and supervisors will have to be men with teaching skills as part of their professional assets for it is upon their shoulders that passing on these new skills and techniques will rest.

—Personally motivated. The man who has personal desire for leadership does not always make the best leader but the man who lacks it is certain to be the worst leader. Strong motivation to accomplish something is so valuable an asset in any foreman or supervisor it should be ranked on a level with any of the more widely recognized MUSTS in selecting new foremen and supervisors.

—A manager. There are no simple procedures in even the lowest and smallest section of a coal company organization any more. Managerial ability cannot be supplied from outside of the supervisors own area of influence. He must have a knowledge of management functions and know how to follow them from the very start or at least be given them immediately following his assignment to the new post.

—Understanding of others motives. Many years ago a foreman could exercise iron discipline over the men under him without regard to consideration of the employee's motives. Today that is virtually impossible as the educational level of the average employee continues to rise and rise. There are many other

outside contributing factors here today that were not in existence twenty years ago. Today's foreman or supervisor must very definitely possess the ability to understand the motives and drives of other men and specifically those who will comprise the department under him.

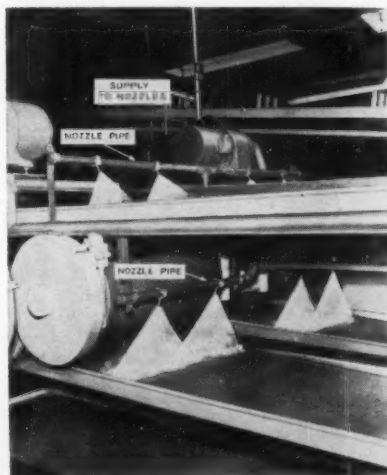
The foregoing represent outstanding traits to look for in considering selection of foremen or supervisory personnel at any level in the modern coal company. They take full recognition of the "new frontiers" in management-labor relations which are most necessary for achievement of harmonious relations between labor and management today.

But more important . . . they are rigid requirements for making certain the job will be done right wherever they may be used.

● Sellers Injector Corp., speeds clean-up time in quarries, mines, cement plants, chemical plants, bottling plants, dairies, milk plants, breweries, bakeries, warehouses, and other industries.

With this system, a 200-foot conveyor belt, for example, operating at an average speed of 20 fpm, can be cleaned in 10 minutes.

The system operates on plant steam and cold water and consists of two basic components. (1) Multiple high pressure nozzles, spaced at intervals across the width of the belt, are permanently positioned over and under the conveyor. The



SEJ6415—Sellers Belt Cleaning System

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nozzles force powerful jets of hot water and detergent against the belt surface at pressures of 125-150 psi. These flat, knife-like jets, spread at approximately 35 degrees, produce a cutting action that strips refuse from the belt.

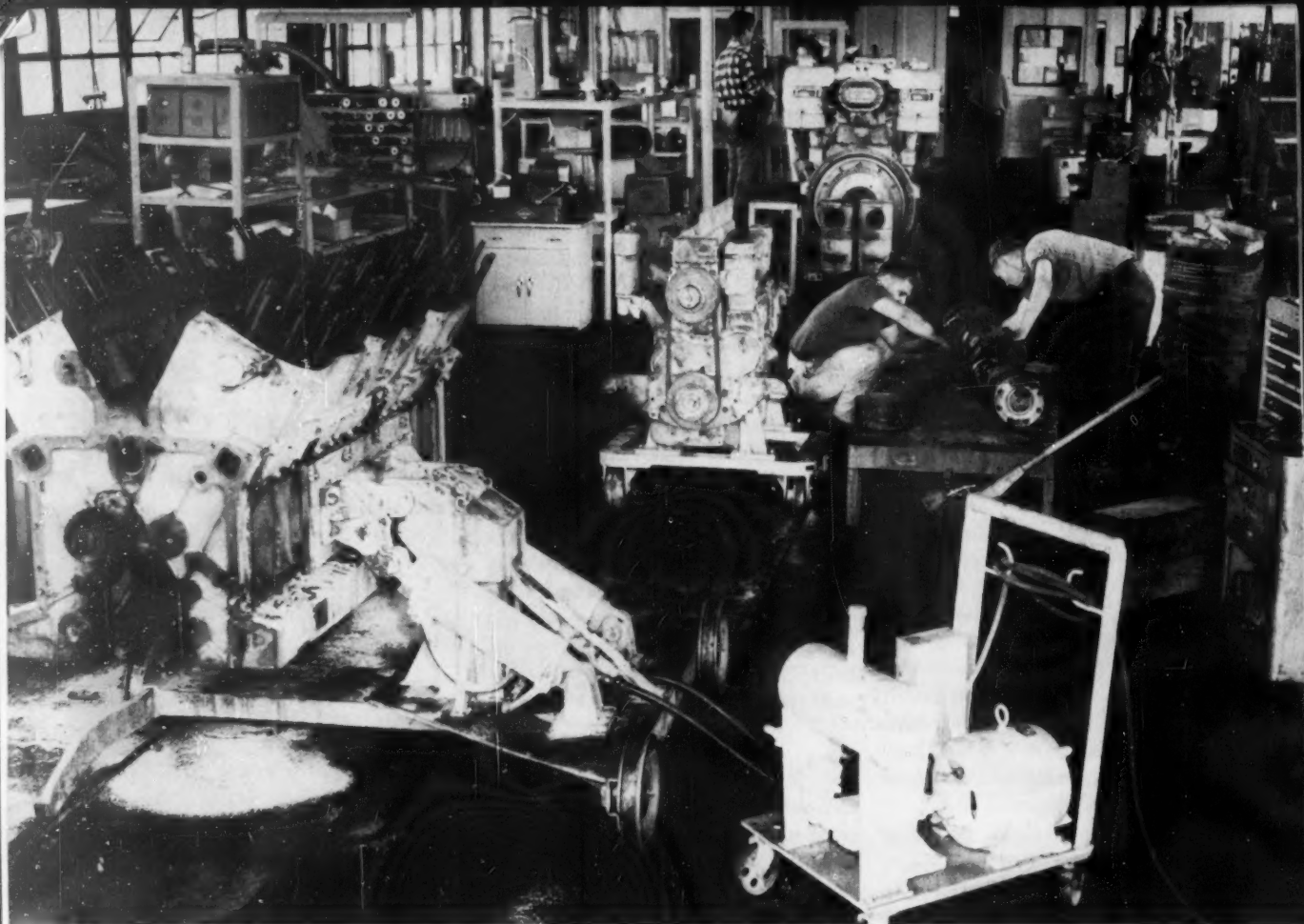
(2) Supplying the nozzles to give high cleaning impact, is a 4000 gph Sellers hydraulic jet unit. Because of its unique venturi-injector design, it is able to combine plant steam, cold water and detergent to deliver hot liquid (180 F°) at a discharge pressure 2 to 20 times higher than input steam pressure. Velocity of the liquid flow is 120 mph.

Since operation is automatic, (simple adjustment of control valves is all that is required to start cleaning and rinse cycles) better belt maintenance is encouraged through more frequent cleaning.

With no tedious hand-scrubbing required, downtime is negligible and cleaning can be done with little or no interruption of plant routine.

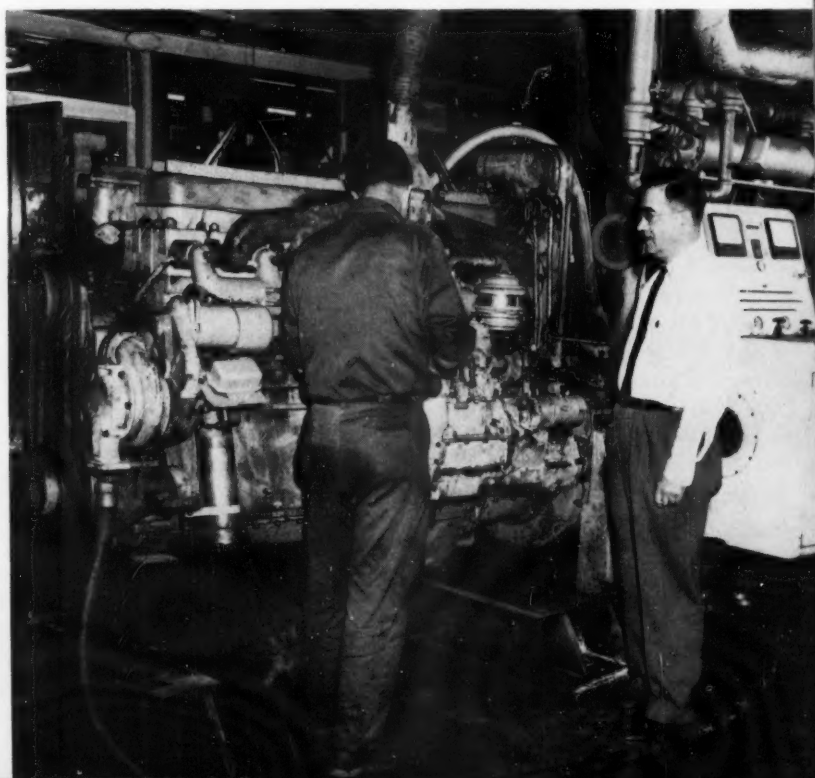
Use of the new system, according to the manufacturer, is not limited to flat rubber belts. It may also be used in cleaning steel mesh belts, metal elevators and elevator belts.

Additional information about the new Sellers conveyor belt cleaning system is available from Sellers Injector Corp., 1600 Hamilton Street, Philadelphia 30, Penna.



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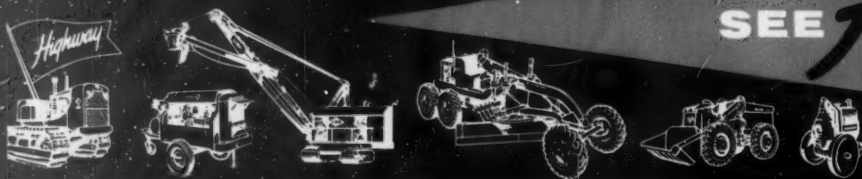


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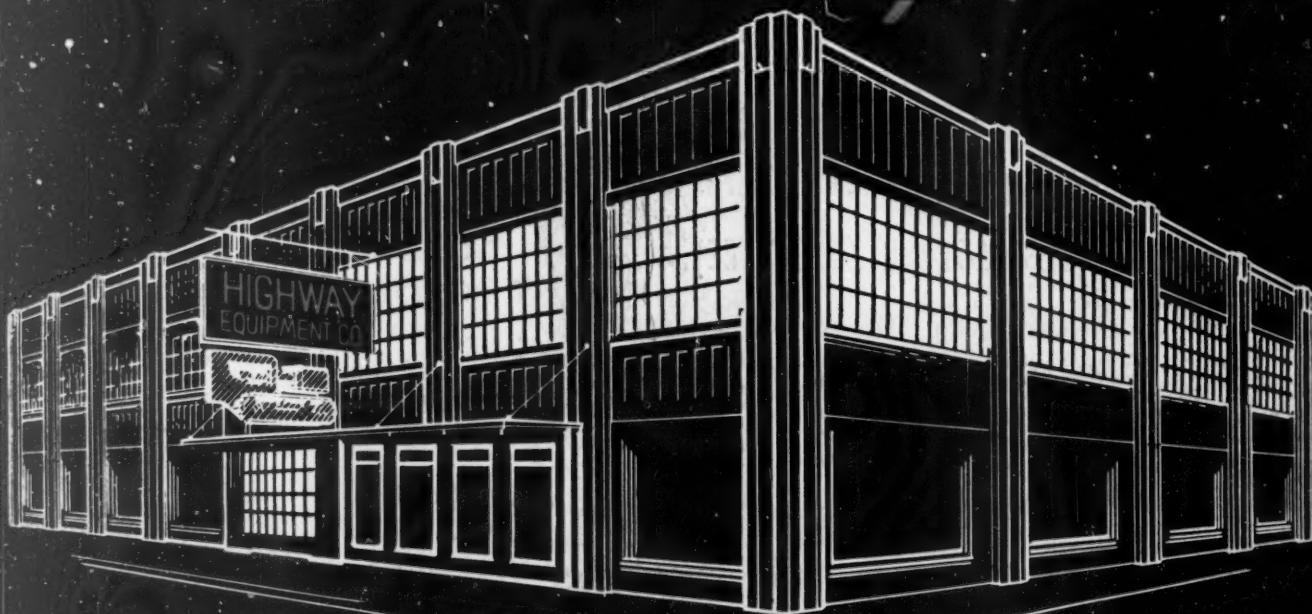
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